

THE EULERIAN AND LAGRANGIAN PREDICTABILITY OF OCEANIC FLOWS

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LONG-TERM GOALS

To put design of drifter experiments on a more objective footing.

OBJECTIVES

To identify robust geometrical structures that help distinguish regions of inherent unpredictability (Lagrangian chaos).

APPROACH

Use idealized analytical and numerical models of meandering currents and eddy fields to perform a dynamical system analysis, revealing said structures.

WORK COMPLETED

Due to allocation of time in my budget, I will not begin spending support for this project until December 1999. Most of my effort has thus been directed at identifying and hiring a postdoctoral investigator for the project. He is Dr. Guocheng Yuan, an applied mathematics major from the University of Maryland. Dr. Yuan has recently arrived in the Northeast, where he will split time between Woods Hole and Brown University. A team consisting of Yuan, C.K.R.T. Jones, and Pat Miller have just begun work on the problem described in our proposal. This problem involves identification of geometrical structures that will determine regions of inherent predictability/unpredictability of deep floats in meandering ocean current systems.

RESULTS

Preliminary work has shown that deep pathways for chaotic exchange of fluid across coastal and free jets occur amid eddy-like structures containing nonchaotic motion. The current model is highly idealized but we hope to eventually proceed to more sophisticated ones. Progress on this topic will be reported on at the special session on predictability at Nice in the spring of 2000.

IMPACT/APPLICATIONS

TRANSITIONS

RELATED PROJECTS

With Audrey Rogerson, our team has also finished the final stages of publication of an article on Lagrangian Chaos and float motion in surface jets. I have also finished two articles on work with Bill Johns and Steve Murray from my previous ONR grant.

REFERENCES

Rogerson, A., P. Miller, L.J. Pratt, and C.K.R.T. Jones, 1999. Lagrangian motion and parcel exchange in a meandering jet, *J. Phys. Oceanogr.*, (in press).

Pratt, L.J., W. Johns, S.P. Murray, and K. Katsumata, 1999. Hydraulic interpretation of direct velocity measurements from the Bab al Mandab, *J. Phys. Oceanogr.*, (in press).

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